

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

| | |
|--|--|
| Date of mailing (day/month/year) 14 November 2000 (14.11.00) | |
| International application No. PCT/EP00/02467 | Applicant's or agent's file reference ML/B45182 |
| International filing date (day/month/year) 17 March 2000 (17.03.00) | Priority date (day/month/year) 19 March 1999 (19.03.99) |
| Applicant CAPIAU, Carine et al | |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 13 October 2000 (13.10.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

| | |
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| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer S. Mafla Telephone No.: (41-22) 338.83.38 |
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| 9916677.9 | 15 July 1999 (15.07.1999) | GB |

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BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK,
DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID,
IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,
LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL,
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MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

(88) Date of publication of the international search report:
1 February 2001

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: VACCINE AGAINST STREPTOCOCCUS PNEUMONIAE

(57) Abstract: The present invention relates to the field of bacterial polysaccharide antigen vaccines. In particular, the present invention relates to vaccines comprising a pneumococcal polysaccharide antigen, typically a pneumococcal polysaccharide conjugate antigen, formulated with a protein antigen form *Streptococcus pneumoniae*, and optionally a Th1-inducing adjuvant.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/02467

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K39/09 A61K39/385 A61K39/39 A61P31/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS, MEDLINE, CHEM ABS Data, EMBASE, SCISEARCH

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | WO 90 06951 A (PATON JAMES CLELAND ; HANSMAN DAVID JOHN (AU); MITCHELL TIMOTHY JOH) 28 June 1990 (1990-06-28) cited in the application page 3, line 35 - page 4, line 23 page 10, line 1 - line 3 | 1-9, 13-18 |
| Y | claims 1-14 | 10-12 |
| X | LEE C J ET AL: "Immunologic epitope, gene, and immunity involved in pneumococcal glycoconjugate." CRITICAL REVIEWS IN MICROBIOLOGY, vol. 23, no. 2, 1997, pages 121-141, XP000946772 | 1-7, 13-18 |
| Y | the whole document, especially page 132 column 2 line 27 - page 135 column 2 line 18 | 8-12 |
| | --- -/-- | |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

13 October 2000

Date of mailing of the international search report

30/10/2000

Name and mailing address of the ISA

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Stein, A

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/02467

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|------------------------|
| X | BRILES DAVID E ET AL: "Pneumococcal diversity: Considerations for new vaccine strategies with emphasis on pneumococcal surface protein A (PspA)." CLINICAL MICROBIOLOGY REVIEWS, vol. 11, no. 4, October 1998 (1998-10), pages 645-657, XP000946754 ISSN: 0893-8512 | 1-7, 13-18 |
| Y | the whole document especially page 646 column 1 line 35 - page 646 column 2 line 9; page 653 column 1 line 27-46 | 8-12 |
| Y | --- WO 96 33739 A (SMITHKLINE BEECHAM BIOLOG ;GARCON NATHALIE MARIE JOSEPHE (BE); FRI) 31 October 1996 (1996-10-31) cited in the application page 1, line 1 -page 3, line 21 claims 1,5,8-10,12 | 8-12 |
| X | --- ALEXANDER JANET E ET AL: "Immunization of Mice with Pneumolysin Toxoid Confers a Significant Degree of Protection against At Least Nine Serotypes of Streptococcus pneumoniae." INFECTION AND IMMUNITY, vol. 62, no. 12, 1994, pages 5683-5688, XP002149967 ISSN: 0019-9567 page 5683, column 1, line 26 -column 2, line 8 page 5687, column 1, line 51 - line 58 | 1-5, 13-18 |
| A | --- MICHON F ET AL: "Multivalent pneumococcal capsular polysaccharide conjugate vaccines employing genetically detoxified pneumolysin as a carrier protein" VACCINE,GB,BUTTERWORTH SCIENTIFIC. GUILDFORD, vol. 16, no. 18, 1998, pages 1732-1741, XP002089380 ISSN: 0264-410X the whole document | 1-5,7-9, 13-18 |
| A | --- DE VELASCO E ALONSO ET AL: "Synthetic peptides representing T-cell epitopes act as carriers in pneumococcal polysaccharide conjugate vaccines." INFECTION AND IMMUNITY, vol. 63, no. 3, 1995, pages 961-968, XP002149966 ISSN: 0019-9567 the whole document | 1-5, 8-11, 13-18 |
| | --- -/-- | |

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/02467

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| A | <p>WO 95 17209 A (SMITHKLINE BEECHAM BIOLOG ;MOMIN PATRICIA MARIE (BE); GARCON NATHA) 29 June 1995 (1995-06-29) cited in the application page 4, line 26 -page 5, line 16 claims 1-5,8-10,12,13 -----</p> | 10-12 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/02467

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/02467

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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| WO 9517209 A | | JP 9506887 T | 08-07-1997 |
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REPLACED BY
ART 34 AMDT

PATENT COOPERATION TREATY

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REC'D 16 MAR 2001

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | | |
|---|--|---|--|
| Applicant's or agent's file reference ML/B45182 | | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/EP00/02467 | International filing date (day/month/year) 17/03/2000 | Priority date (day/month/year) 19/03/1999 | |
| International Patent Classification (IPC) or national classification and IPC A61K39/09 | | | |
| Applicant SMITHKLINE BEECHAM BIOLOGICALS S.A. | | | |
| <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 3 sheets.</p> | | | |
| <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none">I <input checked="" type="checkbox"/> Basis of the reportII <input type="checkbox"/> PriorityIII <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicabilityIV <input type="checkbox"/> Lack of unity of inventionV <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statementVI <input type="checkbox"/> Certain documents citedVII <input checked="" type="checkbox"/> Certain defects in the international applicationVIII <input type="checkbox"/> Certain observations on the international application | | | |
| Date of submission of the demand 13/10/2000 | | Date of completion of this report 13.03.2001 | |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | | Authorized officer Thiele, U Telephone No. +49 89 2399 8643 | |



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/02467

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-72 as originally filed

Claims, No.:

1-15 as received on 05/03/2001 with letter of 02/03/2001

Drawings, sheets:

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/02467

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 12,15.

because:

☒ the said international application, or the said claims Nos. 12,15 relate to the following subject matter which does not require an international preliminary examination (*specify*):
see separate sheet

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Yes: Claims 1-15

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/02467

| | | | |
|-------------------------------|------|--------|--------------------------|
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 1-15 |
| | No: | Claims | |
| Industrial applicability (IA) | Yes: | Claims | 1-11,13,14 |
| | No: | Claims | 12?,15?(see section III) |

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

Section III

Claims 12 and 15 relate to subject-matter considered by this Authority to be covered by the provisions of Rule 67.1(iv) PCT. Consequently, no opinion will be formulated with respect to the industrial applicability of the subject-matter of these claims (Article 34(4)(a)(i) PCT).

For the assessment of said claims on the question whether they are industrially applicable, no unified criteria exist in the PCT Contracting States. The patentability can also be dependent upon the formulation of the claims. The EPO, for example, does not recognize as industrially applicable the subject-matter of claims to the use of a compound in medical treatment, but may allow, however, claims to a known compound for first use in medical treatment and the use of such a compound for the manufacture of a medicament for a new medical treatment.

Section V

- 1) Reference is made to the following documents:

D1: WO 90 06951 A

D2: CRITICAL REVIEWS IN MICROBIOLOGY, vol. 23, no. 2, 1997, pages 121-141

D3: CLINICAL MICROBIOLOGY REVIEWS, vol. 11, no. 4, October 1998, pages 645-657

D4: INFECTION AND IMMUNITY, vol. 62, no. 12, 1994, pages 5683-5688

D5: VACCINE, GB, BUTTERWORTH SCIENTIFIC, GUILDFORD, vol. 16, no. 18, 1998, pages 1732-1741

D6: WO 96 33739 A

- 2) The subject-matter of claim 1 would appear to be novel and inventive in view of the known state of the art (Art. 33(2), (3) PCT).

D1 (see esp. page 2, line 16 - page 4, line 23; page 10, lines 1 - 3; claims 9 - 14, claim 23) merely discloses vaccines comprising at least one Streptococcus

pneumoniae polysaccharide antigen and the *S. pneumoniae* protein antigen pneumolysin in a mutated form, and the preparation thereof. The polysaccharide may be derived from a poly-, esp. 23valent vaccine. Adjuvants such as alumina gel may be added. The antigen / polysaccharide complex is either conjugated or non conjugated. Carrier proteins such as tetanus toxoid are mentioned. The vaccine aims at protecting young children from pneumococcal infection.

D2 (see esp. page 132, col. 2, line 27 - page 135, col. 2, line 18) merely pertains to pneumococcal glycoconjugate vaccines. To this end, inactivated pneumolysin or pneumococcal surface protein A is conjugated to one or more pneumococcal polysaccharides. Carrier proteins such as tetanus toxoid are mentioned. The vaccine aims at protecting infants and the elderly (see page 121, r. col.).

D3 (page 646, chapter headed "Polysaccharide-Protein Conjugate [...]"; page 653, chapter headed "Potential use of PspA [...]") merely suggests in particular the use of Pneumococcal surface protein A as a carrier for pneumococcal polysaccharides in vaccines for young children and the elderly.

D4 overcomes the poor immunogenicity of (multivalent) *S. pneumoniae* polysaccharides in vaccines by including pneumococcal proteins, in particular pneumolysin toxoids, either as protein carrier and/or as protective immunogen in their own right (see esp. page 5683, r.col., lines 4 - 8; p. 5687, "Conclusion").

Lastly, D5 is merely concerned with detoxified pneumolysin as a carrier protein for pneumococcal capsular polysaccharides.

None of the said documents however contemplates the use of an adjuvant which is a preferential inducer of a Th1 response.

Although D6 (see pages 1, 2; claims 1, 5, 8 - 10, 12) discusses such Th1 adjuvants, there is no mention of how it could aid the coordination of humoral and cell-mediated immune responses against pneumococci when present in a composition further comprising a pneumococcal polysaccharide and protein, this being the unexpected effect resulting from the feature distinguishing the subject-matter of claim 1 from D1 - D5. D6 rather teaches that necrosis at the injection site

of vaccination can be avoided by use of formulations containing a combination of such adjuvant and a sterol.

The afore mentioned advantages of the present invention are apparent from the description, page 16, line 27 - page 17, line 6; page 60, lines 8 - 12; and Examples 4B and 4C.

- 3) Independent claims 10 - 15 rely on the same novel and inventive concept as claim 1 and therefore, together with dependent claims 2 - 9, also meet the requirements of Arts. 33(2) and (3) PCT.

Section VII

- 1) Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D2 - D5 is not mentioned in the description, nor are these documents identified therein.
- 2) The description has not been adapted to the wording of the amended claims (Guidelines C-III, 4.3)

Additional note: The applicant submitted written evidence (PubMed entries with PMIDs 11115692, 10217586, 9726341 and 9674889) for a general acceptance of the said term "CRM197" in the technical field concerned.

Claims:

1. An immunogenic composition comprising at least one *Streptococcus pneumoniae* polysaccharide antigen and at least one *Streptococcus pneumoniae* protein antigen or immunologically functional equivalent thereof.
5
2. The immunogenic composition of claim 1, wherein the protein antigen is an outer surface protein or a secreted protein of *Streptococcus pneumoniae* or immunologically functional equivalents thereof.
- 10 3. The immunogenic composition of claims 1 or 2, wherein the protein antigen is a toxin, adhesin or lipoprotein of *Streptococcus pneumoniae* or immunologically functional equivalents thereof.
- 15 4. The immunogenic composition of claims 1-3, wherein the protein antigen or immunologically functional equivalent thereof is selected from the group: pneumolysin, PspA or transmembrane deletion variants thereof, PspC or transmembrane deletion variants thereof, PsaA or transmembrane deletion variants thereof, glyceraldehyde-3-phosphate dehydrogenase, and CbpA or transmembrane deletion variants thereof.
20
5. The immunogenic composition of claims 1-4, wherein the polysaccharide antigen is presented in the form of a polysaccharide-protein carrier conjugate.
- 25 6. The immunogenic composition of claim 5, wherein the carrier protein is selected from the group consisting of: Diphtheria toxoid, Tetanus toxoid, CRM197, Keyhole Limpet Haemocyanin (KLH), protein derivative of Tuberculin (PPD), and protein D from *H. influenzae*.
- 30 7. An immunogenic composition as claimed in any of claims 1 to 6 wherein the vaccine comprises at least four pneumococcal polysaccharide antigens from different serotypes.

8. An immunogenic composition as claimed herein additionally comprising an adjuvant.
9. An immunogenic composition as claimed in claim 8, wherein the adjuvant
5 comprises an aluminium salt.
10. An immunogenic composition as claimed in claim 8, wherein the adjuvant is a preferential inducer of a TH1 response.
- 10 11. An immunogenic composition as claimed in claim 10, wherein the adjuvant comprises at least one of the following: 3D-MPL, a saponin immunostimulant, or an immunostimulatory CpG oligonucleotide.
12. An immunogenic composition as claimed in claim 11, wherein the adjuvant
15 comprises a carrier selected from the group comprising: an oil in water emulsion, liposomes, and an aluminium salt.
13. An immunogenic composition composition as claimed herein for use as a medicament.
- 20 14. A vaccine comprising the immunogenic composition of claims 1-12.
15. A method of preventing or ameliorating *Streptococcus pneumoniae* infection in a patient over 55 years, comprising administering an effective amount of a vaccine
25 comprising a *Streptococcus pneumoniae* polysaccharide and at least one *Streptococcus pneumoniae* protein, and optionally a TH1 inducing adjuvant.
16. Use of a pneumococcal polysaccharide antigen in combination with a *Streptococcus pneumoniae* protein antigen, and optionally a TH1 inducing adjuvant,
30 in the manufacture of a medicament for the prevention of pneumonia in patients over 55 years.

17. A method of making an immunogenic composition as claimed herein, comprising the steps of:

selecting one or more pneumococcal polysaccharide antigen(s);

selecting one or more pneumococcal protein antigen(s); and

5 mixing said polysaccharide and protein antigens with a suitable excipient.

18. A method of preventing or ameliorating Otitis media in Infants, comprising administering a safe and effective amount of a vaccine comprising a *Streptococcus pneumoniae* polysaccharide antigen and a *Streptococcus pneumoniae* protein antigen

10 optionally with a TH1 adjuvant, to said Infant.



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| (21) International Application Number: PCT/EP00/02467 (22) International Filing Date: 17 March 2000 (17.03.00) (30) Priority Data: 9906437.0 ✓ 19 March 1999 (19.03.99) GB 9909077.1 ✓ 20 April 1999 (20.04.99) GB 9909466.6 ✓ 23 April 1999 (23.04.99) GB 9916677.9 ✓ 15 July 1999 (15.07.99) GB (71) Applicant (for all designated States except US): SMITHKLINE BEECHAM BIOLOGICALS S.A. [BE/BE]; Rue de l'Institut 89, B-1330 Rixensart (BE). (72) Inventors; and (75) Inventors/Applicants (for US only): CAPIAU, Carine [BE/BE]; SmithKline Beecham Biologicals s.a., Rue de l'Institut 89, B-1330 Rixensart (BE). DESCHAMPS, Marguerite [BE/BE]; SmithKline Beecham Biologicals s.a., Rue de l'Institut 89, B-1330 Rixensart (BE). DESMONS, Pierre, Michel [BE/BE]; SmithKline Beecham Biologicals s.a., Rue de l'Institut 89, B-1330 Rixensart (BE). LA-FERRIERE, Craig, Antony, Joseph [CA/BE]; SmithKline Beecham Biologicals s.a., Rue de l'Institut 89, B-1330 Rixensart (BE). POOLMAN, Jan [NL/BE]; SmithKline Beecham Biologicals s.a., Rue de l'Institut 89, B-1330 | | Rixensart (BE). PRIEELS, Jean-Paul [BE/BE]; SmithKline Beecham Biologicals s.a., Rue de l'Institut 89, B-1330 Rixensart (BE). (74) Agent: GIDDINGS, Peter, John; SmithKline Beecham Corporate Intellectual Property, Two New Horizons Court, Brentford, Middlesex TW8 9EP (GB). (81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published Without international search report and to be republished upon receipt of that report. | |
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| (57) Abstract | | | |
| <p>The present invention relates to the field of bacterial polysaccharide antigen vaccines. In particular, the present invention relates to vaccines comprising a pneumococcal polysaccharide antigen, typically a pneumococcal polysaccharide conjugate antigen, formulated with a protein antigen form <i>Streptococcus pneumoniae</i>, and optionally a Th1-inducing adjuvant.</p> | | | |

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